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ABSTRACT

This paper will discuss research in progress that investigates whether individual characteristics significantly impact information processing and retrieval on the Internet. The goal of this research is to understand how individual users approach and interact with technology in order to access information. In an effort to enhance and support a greater body of users, this study will integrate knowledge about and evaluate behavior in the human search process via Internet technology.

This paper will outline the research background and motivation, provide a literature review of the subject area and describe the research design for this investigation into individual differences and online searching behavior.

Keywords

Individual Differences Theory of Gender and IT, diversity, online searching, search engines, digital divide, human information behavior.

INTRODUCTION

Though the penetration of the Internet among households in the U.S. is rising, there are still a significant number of people who do not have access to this important technology. The disparity in the amount of people participating and not participating with the Internet has been labeled the "digital divide." Explanations for this gap have been associated with the concept of unequal access, both technological and social.

Technological access corresponds to the physical availability of appropriate computing equipment or the ability to attain the hardware, software, and connectivity necessary to actually utilize Internet technology. Social access involves the skills, knowledge, and perceived benefit needed to engage with the Internet. This type of access takes into account what occurs after a person has the capability and opportunity to use Internet technology. Web searching as a type of user skill enacted on the Internet, can be viewed as a social access factor correlated with the digital divide. Because different experiences of search success and failure may affect an individual's overall level of interaction with the technology, it is important to identify whether individual differences of users affect their performance with Web search engines.

LITERATURE REVIEW

Four bodies of literature are relevant to this topic: human information behavior, the digital divide, individual differences, and identity. The research in human information behavior has developed knowledge about the organization of the search process (Ellis 1989; Kuhlthau, 1991). It has also pointed out that many search systems do not effectively support the iterative nature of human information searching (Bates, 1989; Ingwersen, 1996). However, it is of importance to this stream of research to understand *why* and *how* a user will navigate his or her search for information. This type of study also holds key information for understanding why people may be inhibited or motivated to use the Internet.

The digital divide dichotomizes the issues of the technology "haves" and "have nots (NTIA, 1995)." Although universal access has been identified as a goal, providing physical access alone has not absolved the situation (Kvasny & Keil, Forthcoming). The literature regarding the digital divide points out that demographics have an impact on the computer and Internet use of people (Katz and Aspden, 1997; Hoffman and Novak, 1998). In addition, it appears that different users have different purposes for use of the Internet. Physical access has been focused on how to improve the number of users of technology, but social access has been identified to be the cause of a second-level digital divide (Hargattai, 2003). The second level digital divide refers to user skill levels and social networks as further barriers to technology use. Thus, the study

of individuals' web based searching behavior would inform understanding of the second-level digital divide. In addition, due to the intensely personal nature of the information search process, users of search technology should be evaluated at the individual level to better understand the diverse perspectives and interactions.

Individual differences research aims to identify dimensions that are relevant to everyone but that differentiate among people. According to Cooper and Varma, (1997) "there is now some agreement that in order to predict behavior it is necessary to consider both characteristics of the situation and internal characteristics of the organism – or individual differences – since these two variables may be assumed to interact in complex ways to determine behavior (p. 1)." This notion highlights the importance of investigating the individual within the situated context of the environment in which he or she exists to understand behavior.

Trauth's Individual Differences Theory of Gender and IT, with respect to gender in the Information Technology (IT) workforce, seeks to address underlying reasons for the under representation of women in the IT industry (Trauth, 2006; 2002; Trauth and Quesenberry, 2006; 2005, Trauth, et al., 2004, Quesenberry et al., 2006; Quesenberry and Trauth, 2005; Morgan et al., 2004). This theory also focuses on the differences within instead of between genders and acknowledges that women respond in a variety of ways to external and internal influences. The objective of this research is to evaluate this social shaping on information searching behavior and subsequently extending the Individual Differences Theory of Gender and IT in to the area of human information behavior.

The exploration of information searching behavior lacks a level of depth in relation to individual identity and personal influences. There has been tremendous progress in identifying the components of the process of searching for information, but not in how these elements are enacted uniquely by users. According to Tajfel (1981), social identity theory also incorporates individual differences in respect to behavior, where individuals place themselves on a continuum that depends on the interplay between social and psychological factors.

RESEARCH DESIGN

In order to study the individual differences of users of Web search engines and their performance with technology, a multiple method research design will be employed. Both quantitative and qualitative methods are necessary to capture the data needed to address the research questions posed in this study. For the quantitative method, a questionnaire will be utilized, and a short open-ended interview will serve to fulfill the qualitative aspect. Data regarding personal influences and individual differences bears need for qualitative data to better understand the dimensions of the individual user and their personal influences and experiences with Internet search technology.

The following are the research questions, in an effort to better understand Web searching behavior and users of internet technology:

RQ: How do individual differences of users of influence searching performance with search engines?

RQ1.1: How do demographic differences and group identity affect user performance with search engines?

RQ1.2: How does cognitive style affect user performance with search engines?

RQ1.3: How does level of experience with computing affect user performance with search engines?

RQ1.4: How does self-efficacy interact with demographic differences and group identity, cognitive style, and level of experience to affect user performance with search engines?

Data Collection

Utilizing a mixed-method study to evaluate the proposed research questions will provide sound empirical results which provide a comprehensive view of the user as a person in addition to their information searching behavior. Triangulation of the quantitative data collected with the qualitative data will allow for a better explanation of the findings by proving insight into reasons why some patterns found in the data analysis exist and possibly why some are also not identified.

Searching aspect

The participants will asked to complete a search task on a computer. This task will be regarded as a "search experience" which will be used as a critical incident for the other aspects of the data collection. The term "experience" is being used because this is not a lab search study, instead its use will be as a motivation to facilitate thought regarding the information search process by the research participants. When administering the search task, the browser will be equipped with a wrapper,

a program loaded on the computer which captures information from the browser about any user interaction that is conducted. Examples include mouse or links clicked or characters typed in the browsers.

Individual Differences Questionnaire

The quantitative data collection method in this study will be based largely on constructs developed in a study by Ford et al. (2001). The data collection method from that study included a 63 item questionnaire with a 5-point Likert scale to evaluate individual differences in internet perceptions, levels of experience using a Web search engine, and cognitive complexity. In addition to the "Individual Differences" questionnaire, Riding's (1991) Cognitive Styles Analysis will be administered to measure the participant's cognitive styles.

Short open ended interview

A qualitative data collection method will also be utilized which is based on work conducted by Trauth (2006; 2002; et al., 2004). Trauth's Individual Differences Theory of Gender and IT consists of three constructs including: personal data, shaping and influencing factors, and environmental context. The short open ended interviews will be conducted with participants of the study to gather information regarding each construct. Personal data will inquire about the participants' personal background and demographic characteristics. Shaping and influencing factors will evaluate individuals' influences or experiences in life and with technology. Lastly, environmental context will probe the participants' beliefs about and interaction with the environment in which he or she lives and works.

Data Analysis

The quantitative data collected in the study will be analyzed by two measures, multiple regression analysis and factor analysis. These types of analysis were chosen for their ability to identify significant relationships among variables. The qualitative interview data will be transcribed and then content analyzed. Content analysis allows for themes and categories to be uncovered directly from the data that represent the participants' perspectives.

DISCUSSION

By addressing the significance of individual differences among users, the value of human diversity can be illuminated as a significant factor to be evaluated in systems development and design. By studying the search for information on the Web, more insight can be gained on information processing and behavior among individuals. Lastly, by investigating Web search engines, the role of the technology can be unpacked to determine the ways in which the artifact embodies values or rules that either enhance or inhibit the user experience. The relationship of people, information and technology are integrated in that this research seeks to understand how individual users approach and interact with technology in order to access information.

The results of this study could provide critical design information for creators and administrators of Web search engines. In the event that the results do show a connection between individual differences and online Web searching skill, a case can be supported for a more concentrated research effort into the personalization and customization of Web search engines. In addition, another important contribution of this research would be the articulation of an additional obstacle to user participation with the Internet which also supports further explanation of the problem of the digital divide.

CONCLUSION

This purpose of the project is to contribute to both practice and theory. The contribution to practice is to inform design and development of search engines, and provide data regarding factors influencing user behavior and performance. The contribution to theory will be to extend and support Trauth's Individual Differences Theory of Gender and IT (Trauth, 2006; 2002; Trauth et al., 2004). This area of study is important because a variety of barriers exist to participation with the Internet. So, it is necessary to identify what factors are posing obstacles to use or continued use.

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